

**AMENDMENTS**  
**TO**  
**THE WATER QUALITY CONTROL PLAN**  
**FOR THE SACRAMENTO RIVER AND**  
**SAN JOAQUIN RIVER BASINS**  
**FOR**  
**THE CONTROL OF AGRICULTURAL**  
**SUBSURFACE DRAINAGE DISCHARGES**  
**EXECUTIVE SUMMARY**

**DRAFT REPORT**  
**MARCH 1996**

California Regional Water Quality Control Board  
Central Valley Region

Amendments  
to  
the Water Quality Control Plan for  
the Sacramento River and San Joaquin River Basins  
for  
The Control of Agricultural  
Subsurface Drainage Discharges

Executive Summary

California Valley Region Water Quality Control Board  
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DRAFT REPORT - MARCH 1996  
California Regional Water Quality Control Board  
Central Valley Region  
Sacramento, CA



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## EXECUTIVE SUMMARY

This report summarizes a proposed amendment to the water quality control plan (Basin Plan) for the Sacramento River and San Joaquin River Basins. The amendment primarily addresses regulation of agricultural drainage in a portion of the San Joaquin River watershed.

The preparation and adoption of a Basin Plan is required by California Water Code Section 13240 and the Regional Water Quality Control Board, Central Valley Regional (Regional Board) initially adopted a Basin Plan in 1975. A Basin Plan is the basis for regulatory actions that are to be taken for water quality control. The Basin Plan is also used to satisfy Section 303 of the Clean Water Act which requires states to adopt water quality standards to meet federal regulatory requirements. Basin Plans are adopted and amended by the Regional Board using a structured process involving public participation and state environmental review. A Basin Plan or amendments thereto, do not become effective until approved by the State Water Resources Control Board (State Water Board) and the Office of Administrative Law. A Basin Plan must consist of all of the following (Water Code Section 13050):

- a) beneficial uses to be protected;
- b) water quality objectives; and
- c) a program of implementation needed for achieving water quality objectives.

In 1988, the Regional Board adopted an amendment to the San Joaquin River Water Quality Control Plan for regulation of agricultural subsurface drainage discharges from the Grassland Watershed of Merced and Fresno Counties.

The Regional Board recognized that the 1988 Basin Plan Amendment was a first step in efforts to control agricultural subsurface drainage and that a revision would be needed as new information became available. The Regional Board has initiated its effort to review the present San Joaquin River Basin Plan and its implementation plan for regulating agricultural subsurface drainage discharges. The focus of the proposed Basin Plan Amendment is on the control of selenium. This focus is consistent with the Regional Board policy to address toxicants in subsurface drainage as a first priority. Other constituents found in subsurface drainage, such as boron and salt, also impact agricultural beneficial uses. High levels of boron and salt are present in shallow groundwater throughout the west side of the San Joaquin River Basin, whereas, high levels of selenium are limited to a Drainage Problem Area in the Grassland Watershed. The present review of the Basin Plan does not include a review of the water quality objectives or an implementation program for boron and salt, since the sources and beneficial use impacts of these constituents differ significantly from selenium. An amendment to the Basin Plan which specifically addresses salinity and boron will be prepared at a future date.

Three staff reports on the potential amendment to the Basin Plan were prepared and were the subject of public workshops. This Basin Plan Amendment report is based on the staff reports, comments received at the workshops, and written comments received on the staff reports.

If adopted, the Basin Plan Amendment would result in: 1) new, more stringent selenium water quality objectives in the Grassland watershed wetland supply channels, Salt Slough, Mud Slough (north), and the San Joaquin River; 2) the elimination of subsurface drainage discharges into wetland supply channels, Salt Slough, and Mud Slough (north), unless water quality objectives are being met; 3) the use of waste discharge requirements to control agricultural subsurface drainage discharges to the San Joaquin River below the Merced River confluence; and 4) the prohibition of any new agricultural subsurface drainage discharges from the Grassland watershed unless that discharge is governed by waste discharge requirements.

The amendment is documented in two reports; an executive summary and a full staff report. This document is the executive summary and provides background information and outlines the proposed modifications and additions to the Basin Plan. The full staff report is available from the Agricultural Unit of the Central Valley Regional Water Quality Control Board's Sacramento Office upon request. The full report presents the Basin Plan Amendment and provides the rationale behind each part of the amendment as follows: Part I contains historical and background information; Part II presents the Basin Plan Amendment, which includes beneficial use designations, water quality objectives, and an implementation plan; Part III discusses the rationale for the beneficial uses; part IV discusses the rationale for the water quality objectives and; part V discusses the rationale for the program of implementation and includes a discussion of policies, prohibitions, control actions, and the time schedule for compliance. Part V also contains a discussion of a proposed Total Maximum Daily Load (TMDL) submittal to the U.S. Environmental Protection Agency (U.S. EPA) for selenium in the San Joaquin River. This submittal satisfies the requirements of Section 303(d) of the Clean Water Act. Part VI includes the California Environmental Quality Act (CEQA) documentation with supporting material. Sections III, IV, and V (beneficial uses, water quality objectives, and the program of implementation) all begin with a brief discussion of the alternatives considered. The staff report also provides an evaluation of economic impacts.

The proposed Basin Plan Amendment will be the subject of a public hearing before the Regional Board. After the public hearing is closed, the Regional Board may adopt the amendment as proposed or make modifications to the proposed amendment (major modifications would require a new public hearing). The Executive Officer will submit the TMDL to the U.S. EPA for approval upon adoption of the Basin Plan Amendment.

**The public hearing is scheduled for 3 May 1996.** Interested parties are encouraged to comment on the proposed Basin Plan Amendment and staff report. Specific comments on the proposed TMDL are also being solicited at this time. Staff will provide a written response to comments received by 17 April 1996. To assist staff in identifying and responding to comments,

please submit written comments in the format suggested on page 20. The suggested format is to number the comment, state in one sentence the topic of the comment, followed by supporting argument and a specific recommendation. If you have any questions concerning this amendment, please contact Al Vargas at (916) 255-3089.

### **Watershed Areas to Be Considered**

The amendment being developed is for the San Joaquin River Basin Plan. The area covered by this Basin Plan is the San Joaquin River and its tributaries. There are two hydrologic areas being considered under this Basin Plan amendment (Figure 1). The first is the Grassland watershed which is a valley floor drainage basin on the western side of the San Joaquin River and includes the San Joaquin River from Sack Dam to the mouth of the Merced River. The second is the main stem of the San Joaquin River downstream of the Merced River. Differences in geology and hydrology between the two areas significantly affects water quality and the steps needed to protect beneficial uses.

The Grassland watershed is one of the principal drainage basins within the western portion of the valley floor. The Grassland watershed area considered in this basin plan amendment includes the area east of Interstate 5 and west of the San Joaquin River. The alluvial fan of Orestimba Creek forms the northern boundary and the Tulare Lake Basin forms the southern boundary. This area is composed of approximately 370,000 acres. The principal drainage ways for the Grassland watershed are Mud Slough (north) and Salt Slough. Both sloughs discharge to the San Joaquin River upstream of the Merced River inflow near the northern boundary of the watershed. These sloughs have undergone dramatic changes in their hydrology and water quality in the past century due to agricultural development and alteration of the San Joaquin River hydrology.

The second hydrologic area, the San Joaquin River downstream of the Merced River inflow, is primarily influenced by flows from the Sierra Nevada Mountains. The tributary inflows in this reach include the Merced, Tuolumne, and Stanislaus Rivers, each of which provides high quality flows. Water quality in this reach of the San Joaquin River is significantly influenced by the quality of discharges from the westside drainage basins such as those coming from the Grassland watershed and the amount of flow available from the eastside tributaries.

### **Need for a Revision to the Basin Plan**

In December 1992, the U.S. EPA promulgated a 5  $\mu\text{g/L}$ , 4-day average selenium water quality criteria for all of the water bodies (except wetlands) that were listed in the 1988 Regional Board Basin Plan Amendment. The promulgation superseded the selenium water quality objectives adopted by the Regional Board in the 1988 Basin Plan Amendment.



The 1992 promulgation of more stringent water quality criteria by the U.S. EPA also raised a question regarding the adequacy of the previously adopted water quality objectives and the implementation plan outlined in the Basin Plan. The U.S. EPA promulgation of the national water quality criteria, however, did not include an evaluation of the means of compliance or the cost of compliance, both requirements under State law.

Under the 1988 Basin Plan Amendment, the Regional Board emphasized on-farm water conservation measures as the primary method for meeting water quality objectives and reducing pollutant loads. Studies conducted for the Regional Board show that irrigation efficiency has improved in the Drainage Problem Area. However, although selenium loads decreased by 66% between water year (WY) 1989 and WY 1992, they increased in WY 1993 and remained elevated in WY 1994. Selenium loads in WY 1994 were similar to those in WY 1989, when the Basin Plan amendment was adopted. The increase in load in WYs 1993 and 1994 occurred despite continuing increases in irrigation efficiency.

An increase in irrigation efficiency can result in a reduction in high quality surface runoff (tail water) and/or poorer quality deep percolation (tile water). The drought and restrictions in water supply since 1988 prompted adoption of farm water conservation measures to minimize the discharge of the high quality tail water and operational spills. Previously, these better quality flows served to dilute the agricultural subsurface drainage flows. Discharge from the Drainage Problem Area is now dominated by poor quality tile water, thereby raising the concentration of drainage discharges. Although loads decreased significantly by WY 1992, the increases in effluent concentration combined with the lack of dilution flow in the sloughs resulted in little change in water quality in the sloughs.

In contrast, water quality in the San Joaquin River downstream of the Merced River improved dramatically in response to the load reductions. For example, the large selenium load reductions in WY 1992 resulted in only one month when the monthly mean selenium concentration exceeded  $8 \mu\text{g/L}$ . The increase in selenium load to the San Joaquin River in WY 1994 led to monthly mean selenium concentrations exceeding  $8 \mu\text{g/L}$  in three out of twelve months downstream of the Merced River.

Failure to meet water quality objectives for selenium and other constituents has led the State of California to list the lower reach of the San Joaquin River as a water quality limited segment as required by the Federal Clean Water Act. In addition to listing a water body, Federal regulations require the calculation of a "Total Maximum Daily Load" (TMDL) for the listed water body. The TMDL is then apportioned to point sources, non-point sources, and a margin of safety. The TMDL is a load based objective which is designed to attain and maintain the numeric concentration-based water quality objective.

Under the direction of the State Water Board staff, Regional Board staff have developed a TMDL workplan for the highest priority water bodies in the Region with U.S. EPA approving the development of a TMDL for selenium as the highest priority for the San Joaquin River. This

TMDL is proposed as part of the implementation plan for controlling subsurface agricultural drainage and is discussed in detail in the full staff report.

### **Other Developments Affecting Subsurface Drainage**

In September 1990, one year after the State Water Board approved the Basin Plan Amendment for controlling subsurface drainage, the San Joaquin Valley Drainage Program (SJVDP) completed their recommended Management Plan. The plan concentrated on implementation of in-valley management measures through the year 2040. Specific actions were presented on a watershed basis with all of the Drainage Problem Area being within the zone called the Grassland watershed.

In 1992, the Central Valley Project Improvement Act (CVPIA) was signed into Federal law. CVPIA provided for 180,000 acre-feet of water for wetlands in the Grassland watershed, one of the implementation steps of the SJVDP Plan. This included water for development of the new state and Federal refuge lands as mitigation for Kesterson Reservoir impacts. However, many of the channels used to deliver wetland supplies are also used to convey drainage water.

This shared conveyance system has led to restrictions in the timing of water deliveries to certain wetland areas due to the presence of selenium in the drainage water. These restrictions have occurred with the existing 51,000 acre-feet of delivered supply and will be compounded when the new supplies under CVPIA are delivered in the next few years. This shared conveyance system raises the likelihood for violations of the water quality objective for wetland water supplies. Optimal wetland habitat development will not occur and beneficial use impacts will continue if a conveyance system free of high selenium levels is not available.

In summary, several developments since the State Water Board approved the existing Basin Plan Amendment in 1989 require a reevaluation of the Regional Board agricultural subsurface drainage policies and regulations:

- 1) Although water conservation measures have been implemented, selenium loads are at the same level as in 1989;
- 2) Water quality in Mud Slough (north), Salt Slough, and the San Joaquin River upstream of the Merced River does not improve in response to pollutant load reductions;
- 3) U.S. EPA promulgated selenium water quality objectives for the San Joaquin River and sloughs are currently being exceeded at the same rate as in 1989;
- 4) The U.S. EPA promulgation of the national selenium criteria for the sloughs and San Joaquin River necessitates the Regional Board to consider whether an implementation plan can be developed to meet these criteria;

- 5) Federal law and regulations require the development of a TMDL for selenium in the San Joaquin River;
- 6) Completion of the SJVDP Management Plan requires a reassessment of the Regional Board subsurface drainage policies and implementation strategy in the Basin Plan and to evaluate whether the SJVDP conclusions are adequate to meet the new U.S. EPA promulgated water quality objectives;
- 7) Concern over the need to expand protection of wetland water supplies; and
- 8) The need to consider agricultural drainage water management on a watershed basis as proposed in the SJVDP Management Plan.

### **Proposed Amendments to the Basin Plan**

The proposed Basin Plan amendment consists of additions, deletions, and modifications to several sections of the present Basin Plan. The amendment is based on modifications to the current plan which would be consistent with recommended alternatives for appropriate beneficial uses, water quality objectives and a program of implementation for water bodies contained within the Grasslands watershed.

The proposed changes to the Basin Plan are summarized in Tables 1 through 8. The additions are highlighted (highlighted) and the deletions are marked in strikeout (strikeout). The proposed modifications are summarized as follows.

#### **Modifications to Basin Description (Table 1)**

A description of the Grassland watershed is proposed as an addition to the Basin Description section of the Basin Plan.

#### **Modification to Beneficial Uses (Table 2)**

The modifications to beneficial uses consist of the identification of beneficial uses for additional surface water bodies - Salt Slough, Mud Slough (north), and wetland water supply channels in the Grassland watershed. The wetland water supply channels being considered are described in Appendix 1 of this report and will be incorporated into the Basin Plan as Appendix 40.

#### **Modifications to Water Quality Objectives (Table 3)**

The selenium water quality objectives are modified for the San Joaquin River from Sack Dam to Vernalis, Mud Slough (north), Salt Slough, and the wetland water supply channels in the Grassland watershed.

## Modifications to Program of Implementation

### **Policies - (Table 4)**

There are eight policies regarding the control of agricultural subsurface drainage. Four of these policies have been modified ("b", "d", "e", and "f") from those already existing in the Basin Plan. Two policies have been proposed for addition ("g" and "h") and none are proposed for deletion. These policies are used as the basis for developing prohibitions and control actions.

### **Prohibitions - (Table 5)**

The prohibitions related to San Joaquin River Subsurface Agricultural Drainage have been expanded. The prohibitions now include the time schedule for compliance for the selenium water quality objective in Salt Slough and the wetland water supply channels as well as Mud Slough (north) and the San Joaquin River from Sack Dam to the mouth of the Merced River. An annual selenium load cap for discharge into the San Joaquin River is also proposed.

### **Control Actions - (Table 6)**

The program of implementation contains actions that may be taken to control the discharge of agricultural subsurface drainage. The control actions include: those actions recommended for implementation by the State Water Board; actions recommended for implementation by other agencies; and the required actions and time schedule for compliance for selenium water quality objectives.

### **Cost and Funding Sources - (Table 7)**

The cost of achieving water quality objectives and potential funding sources are modified based on information obtained from the San Joaquin Valley Drainage Program Final Report and provided by the San Luis Delta Mendota Water Authority

### **Surveillance and Monitoring (Table 8)**

Modifications to the surveillance and monitoring program to assess the program of implementation is depicted.

**Table 1. Proposed Grassland Watershed Description**

The Grassland watershed is a valley floor sub-basin of the San Joaquin River Basin. The portion of the watershed for which agricultural subsurface drainage policies and regulations apply covers an area of approximately 370,000 acres and is bounded on the north by the alluvial fan of Orestimba Creek and by the Tulare Lake Basin to the south. The San Joaquin River forms the eastern boundary and Interstate Highway 5 forms the approximate western boundary. The San Joaquin River forms a wide flood plain in the region of the Grassland watershed.

The hydrology of the watershed has been irreversibly altered due to water projects and is presently governed by land uses. These uses are primarily managed wetlands and agriculture. The wetlands form important waterfowl habitat for migratory waterfowl using the Pacific Flyway. The alluvial fans of the western and southern portions of the watershed contain salts and selenium which can be mobilized through irrigation practices and can impact beneficial uses of surface waters and wetlands if not properly regulated.

**Table 2. Proposed Beneficial Uses for Mud Slough (north), Salt Slough, and Wetland Water Supply Channels**  
**(Note that all identified water bodies and beneficial uses are proposed additions to the current Basin Plan.)**

Surface Water Body	Water Use				Recreational				Fresh Water Aquatic Life						Wildlife			
	MUN	IND		AGR	REC-1	REC-2		COMM	SHELL	WARM	COLD	MIGR		SPWN		WILD	BIOL	
	Municipal and Domestic Supply	Industrial Process	Industrial Service	Irrigation	Stock Watering	Contact	Non-contact	Canoeing	Sports Fishing	Shellfish Harvesting	Warm Water Habitat	Cold Water Habitat	Warm Water Species	Cold Water Species	Warm Water Species	Cold Water Species	Wildlife Habitat	Preserve
Salt Slough				●	●	●	●		●	●	●				●		●	●
Mud Slough (north)				1	●	●	●		●	●	●				●		●	
Wetland water supply channels 3				1	●						2						●	●

● Identified beneficial use

- <sup>1</sup> Elevated natural salt and boron concentrations may limit this use to irrigation of salt and boron tolerant crops. Also intermittent low flow conditions may limit this use.
- <sup>2</sup> Wetland channels can sustain aquatic life but due to fluctuating flow regimes and habitat limitations may not be suitable for rearing and propagation.
- <sup>3</sup> Wetland water supply channels where beneficial uses apply are defined in Appendix 40.

**Table 3. Proposed Selenium Water Quality Objectives for the  
San Joaquin River, Mud Slough (north), Salt Slough, and  
Wetland Water Supply Channels**

Location	Selenium Concentration ( $\mu\text{g/L}$ )	
	average	maximum
San Joaquin River, mouth of Merced River to Vernalis	5 (4-day average)	12
<del>Salt Slough</del> , Mud Slough (north) and San Joaquin River from Sack Dam to the mouth of the Merced River	5 (4-day average)	20
Salt Slough and wetland water supply channels in the Grassland watershed <sup>1</sup>	2 (monthly mean)	20

<sup>1</sup> Water supply channels where this objective applies are defined in Appendix 40.

**Table 4. Proposed Changes to the Policies**

- a. The control of toxic trace elements in agricultural subsurface drainage, especially selenium, is the first priority. (Existing - unchanged)
- b. Activities that increase the discharge of poor quality agricultural subsurface drainage ~~are prohibited~~ will be discouraged through the adoption of prohibitions of discharge and other control measures. (Existing - Revised)
- c. The control of agricultural subsurface drainage will be pursued on a regional basis. (Existing - unchanged)
- d. The reuse of agricultural subsurface drainage will be encouraged and actions that would limit or prohibit it ~~reuse~~ discouraged. (Existing - Revised)
- e. ~~Of the two major options for disposal of salts produced by agricultural irrigation, e~~ Export out of the basin of accumulated salts due to agricultural irrigation and wetlands management ~~has less potential for environmental impacts and, therefore,~~ is the favored disposal option. The San Joaquin River may continue to be used to remove these salts from the basin so long as water quality objectives are met. (Existing - Revised)
- f. ~~The A~~ valley-wide drain to carry the salts generated by agricultural irrigation out of the valley remains the best technical solution to the water quality problems of the San Joaquin River and Tulare Lake Basins. The drain would carry wastewater high in salt and unfit for reuse that is generated by municipal, industrial, agricultural and wetland management activities.

The Regional Board, at this time, feels that a valley-wide drain will be the only feasible, long-range solution for achieving a salt balance in the Central Valley. The Regional Board favors the construction of a valley-wide drain under the following conditions:

All toxicants would be reduced to a level which would not harm beneficial uses of receiving waters;

The discharge would be governed by specific discharge and receiving water limits in an NPDES permit; and

Long-term, continuous biological monitoring would be required. (Existing - Revised)

- g. Optimizing protection of beneficial uses on a watershed basis will guide the development of actions to regulate agricultural subsurface drainage discharges. (New)
- h. For regulation of selenium discharges, actions need to be focused on selenium load reductions. (New)



**Table 5. Proposed Prohibitions**

Activities that increase the discharge of poor quality agricultural subsurface drainage are prohibited. (This is part of the San Joaquin River Agricultural Subsurface Drainage Policy discussed on page IV-17.)

- a. The discharge of agricultural subsurface drainage from the Grassland watershed to the San Joaquin River or its tributaries from any on-farm subsurface drain, open drain, or similar drain system is prohibited, unless such discharge began prior to (the effective date of this amendment) or unless such discharge is governed by waste discharge requirements.
- b. The discharge of agricultural subsurface drainage water to Salt Slough and wetland water supply channels identified in Appendix 40 is prohibited after 1 October 1996, unless water quality objectives are being met. This prohibition may be reconsidered if public or private interests prevent the implementation of a separate conveyance facility for agricultural subsurface drainage.
- c. The discharge of agricultural subsurface drainage water to Mud Slough (north) and the San Joaquin River from Sack Dam to the mouth of the Merced River is prohibited after 1 October 2010, unless water quality objectives are being met. This prohibition may be reconsidered if public or private interests prevent the implementation of a separate conveyance facility for agricultural subsurface drainage to the San Joaquin River.
- d. The discharge of selenium from agricultural subsurface drainage systems in the Grassland watershed is prohibited in amounts exceeding 8,000 lbs/year for all water year types beginning 1 October 1996.

**Table 6. Proposed Changes to the Control Actions Governing the Regulation of Agricultural Subsurface Drainage Discharges in the San Joaquin Valley**

<b>Actions Recommended for Implementation by Other Agencies</b>	
<b>State Water Board</b>	
1.	As a last resort and where the withholding of irrigation water is the only means of achieving significant improvements in water quality, the Regional Board will consider requesting that the State Water Board use its water rights authority to preclude the supplying of water to specific lands, if water quality objectives are not met by the specified compliance dates and Regional Board administrative remedies fail to achieve compliance.
2.	The State Water Board should require all water agencies in the San Joaquin Basin, regardless of size, to submit an "informational" report on water conservation.
3.	The State Water Board should work jointly with the Regional Board in securing compliance with the 2 µg/L selenium objective for managed-wetlands in the Grassland area.
4.	The State Water Board give first priority to the use of the Water Conservation and Water Quality Bond Law of 1986 funds for subsurface drainage pollutant control projects in the San Joaquin Basin, especially in those areas that contribute selenium to the San Joaquin River.
5.	The State Water Board should also consider utilizing State Assistance Program Grant funds to implement a cost share program to install a number of flow monitoring stations within the Grassland area to assist in better defining the movement of pollutants through the area.
6.	The State Water Board should continue to consider the Drainage Problem Area in the San Joaquin Basin and the upper Panoche watershed (in the Tulare Basin) as priority nonpoint source problems in order to make USEPA nonpoint source control funding available to the area.
7.	The State Water Board should seek funding for research and demonstration of advanced technology that will be needed to achieve final selenium loads necessary to meet selenium water quality objectives.
<b>Other Entities</b>	
1.	The entire drainage issue is being handled as a watershed management issue. The entities in the Drainage Problem Area and entities within the remainder of the Grassland watershed need to establish a regional entity with authority and responsibility for drain water management.
2.	The regional drainage entity and agricultural water districts should consider adopting economic incentive programs as a component of their plans to reduce pollutant loads. Economic incentives can be an effective institutional means of promoting on-farm changes in drainage and water management.
3.	If fragmentation of the parties that generate, handle and discharge agricultural subsurface drainage jeopardizes the achievement of water quality objectives, the Regional Board will consider petitioning the Legislature for the formation of a regional drainage district.

**Table 6. Proposed Changes to the Control Actions Governing the Regulation of Agricultural Subsurface Drainage Discharges in the San Joaquin Valley (Continued)**

**Other Entities (continued)**

42. The Legislature should consider putting additional bond issues before the voters to provide low interest loans for agricultural water conservation and water quality projects and incorporating provisions that would allow recipients to be private landowners, and that would allow irrigation efficiency improvement projects that reduce drainage discharges to be eligible for both water conservation funds and water quality facilities funds.
53. The San Joaquin Valley Drainage Implementation Program should continue to investigate the alternative of a local San Joaquin River Basin drain to move the existing discharge point for poor quality agricultural subsurface drainage to a location where its impact on water quality is less. The San Joaquin Valley Drainage Program should also investigate the plan to use the San Luis Drain (the Zahm-Sansoni Plan) as the first phase of this alternative.
4. The US Bureau of Reclamation should give the districts and growers subject to this program first priority in their water conservation loan program.
6. The selenium water quality objective for the wetland channels can not be achieved without removal of drainage water from these channels. The present use of the Grassland channels has developed over a 30-year period through agreements between the dischargers, water and irrigation districts, the U.S. Bureau of Reclamation, the California Department of Water Resources, the U.S. Fish and Wildlife Service, the California Department of Fish and Game, the Grassland Water District and the Grassland Resource Conservation District. Because each entity shared in the development of the present drainage routing system, each shares the responsibility for implementation of a wetlands bypass.

**Actions and Schedule to Achieve Water Quality Objectives**

1. In developing control actions for selenium, the Regional Board will utilize a priority system which focuses on a combination of sensitivity of the beneficial use to selenium and the environmental benefit expected from the action.
2. Control actions which result in selenium load reduction are most effective in meeting water quality objectives.
3. With the uncertainty in the effectiveness of each control action, the regulatory program will be conducted as a series of short-term actions that are designed to meet long-term water quality objectives.
4. Best management practices, principally water conservation measures, are applicable to the control of agricultural subsurface drainage.
4. Performance goals will be used to measure progress toward achievement of water quality objectives for selenium. Prohibitions of discharge and waste discharge requirements will be used to control agricultural subsurface drainage discharges containing selenium. Compliance with performance goals and water quality objectives for nonpoint sources will occur no later than the dates specified in Table IV-4.

**Table 6. Proposed Changes to the Control Actions Governing the Regulation of Agricultural Subsurface Drainage Discharges in the San Joaquin Valley (Continued)**

**Table IV-4 SUMMARY OF SELENIUM WATER QUALITY OBJECTIVES AND COMPLIANCE TIME SCHEDULE**

**Selenium Water Quality Objectives (in bold) and Performance Goals (in italics)**

Water Body/Water Year Type <sup>1</sup>	1 October 1996	1 October 2002	1 October 2005	1 October 2010
Salt Slough and Wetland Water Supply Channels	<b>2 µg/L monthly mean</b>			
San Joaquin River below the Merced River; Above Normal and Wet Water Year types		<i>5 µg/L monthly mean</i>	<b>5 µg/L 4-day avg.</b>	
San Joaquin River below the Merced River; Critical, Dry, and Below Normal Water Year types		<i>8 µg/L monthly mean</i>	<i>5 µg/L monthly mean</i>	<b>5 µg/L 4-day avg.</b>
Mud Slough (north) and the San Joaquin River from Sack Dam to the Merced River.				<b>5 µg/L 4-day avg.</b>

<sup>1</sup> The water year classification will be established using the best available estimate of the 60-20-20 San Joaquin Valley water year hydrologic classification at the 75% exceedance level (Department of Water Resources Bulletin 120). The previous water year's classification will apply until an estimate is made of the current water year.

5. Waste discharge requirements may be used to control agricultural subsurface drainage discharges containing toxic trace elements, if water quality objectives are not continuously achieved beginning with the following dates:

January 1989 -- Molybdenum

~~October 1989 -- Selenium:~~

~~Water supply channels for Grassland Water District and State and federal refuges~~

October 1991 -- ~~Selenium and b~~Boron:

San Joaquin River, mouth of the Merced River to Vernalis

October 1993 -- ~~Selenium and b~~Boron:

Salt Slough, Mud Slough (north), and the San Joaquin River from Sack Dam to the mouth of the Merced River.

**Table 6. Proposed Changes to the Control Actions Governing the Regulation of Agricultural Subsurface Drainage Discharges in the San Joaquin Valley (Continued)**

6. ~~Milestones to the achievement of water quality objectives for selenium were used.~~
  6. Selenium load reduction milestones will be incorporated into waste discharge requirements as effluent limits as necessary to ensure that:
    - a. the selenium water quality objective in the San Joaquin River downstream of the Merced River inflow is achieved.
    - b. Clean Water Act requirements for the implementation of a TMDL are satisfied.
  7. Effluent limits established in waste discharge requirements will be applied to the discharge of subsurface drainage water from the Grassland watershed. In the absence of a regional entity to coordinate actions on the discharge, the Regional Board will consider setting effluent limits at each drainage water source (discharger) to ensure that beneficial uses are protected at all points downstream.
  8. ~~Upslope irrigations and water facility operators whose actions contribute to subsurface drainage flows will participate in the program to control discharges beginning in January 1989.~~
  9. ~~The Regional Water Board staff will prepare a study plan that identifies the information needed to reconsider selenium and boron objectives.~~
  9. ~~Public and private managed-wetlands will participate in the program to achieve water quality objectives.~~
  10. Meeting load reduction milestones is highly dependent upon the effectiveness of individual actions or technology not currently available; therefore, the Regional Board will review the waste discharge requirements and compliance schedule at least every 5 years.
  11. ~~Annual submittal and approval of drainage operations plans (DOP) is required from~~ All those discharging or contributing to the generation of agricultural subsurface drainage ~~from 1989 through 1993~~ will be required to submit for approval a short-term (5-year) drainage management plan designed to meet interim milestones and a long-term drainage management plan designed to meet final water quality objectives.
  12. An annual review of the effectiveness of control actions taken will be conducted by those contributing to the generation of agricultural subsurface drainage.
  13. ~~Evaporation basins in the San Joaquin Basin will be required to meet minimum design standards, have waste discharge requirements and be part of a regional plan to control agricultural subsurface drainage.~~
  14. The Regional Board staff will coordinate with US EPA and the dischargers on a study plan to support the development of a site specific selenium water quality objective for the San Joaquin River and other effluent dominated waterbodies in the Grassland watershed.
  15. ~~The Regional Board will reconsider site-specific water quality objectives for selenium and boron for Mud Slough (north), Salt Slough and the San Joaquin River, Sack Dam to Vernalis as needed and establish water quality objectives for salinity for the San Joaquin River. based upon the final Delta Plan that is approved by the State Water Board and USEPA.~~
- The Regional Water Board is currently in the process of updating and revising the implementation plan to control agricultural subsurface drainage.

**Table 7. Proposed Changes to the Estimated Costs of Agricultural Water Quality Control Programs and Potential Sources of Financing**

**San Joaquin River Subsurface Agricultural Drainage Program**

The estimates of capital and operational costs to achieve the selenium objective for the San Joaquin River and wildlife areas range from approximately four to nine million dollars per year (1988 dollars). A more detailed estimate is given in Table 6, Exhibit A, of Resolution No. 88-195. \$3.6 million/year to \$27.4 million/year (1990 dollars). The cost of meeting water quality objectives in Mud Slough (north), Salt Slough, and the wetland supply channels is approximately \$2.7 million/year.

**Table 8. Proposed Changes to Surveillance and Monitoring**

**San Joaquin River Subsurface Agricultural Drainage Monitoring Program**

1. The dischargers will monitor discharge points and receiving waters for constituents of concern and flow (discharge points only).
- ~~2. The Regional Water Board will continue to monitor the major discharges, tributaries and the San Joaquin River.~~
2. The Regional Board will inspect discharge flow monitoring facilities and will continue its cooperative effort with dischargers to ensure the quality of laboratory results.
- ~~3. The Regional Water Board will continue its investigations into pollutant transport mechanisms and sinks.~~
3. The Regional Board will, on a regular basis, inspect any facilities constructed to store or treat agricultural subsurface drainage.
- ~~4. The Regional Water Board will inspect discharger monitoring and treatment facilities.~~
4. The Regional Board will continue to maintain and update its information on agricultural subsurface drainage facilities in the Grassland watershed. Efforts at collecting basic data on all facilities, including flow estimates and water quality will continue.
5. The Regional Water Board, in cooperation with other agencies, will regularly assess water conservation achievements, and compile cost and drainage reduction effectiveness information cost of such efforts and drainage reduction effectiveness information. In addition, in cooperation with the programs of other agencies and local district managers, the Regional Board will gather information on irrigation practices, i.e., irrigation efficiency, pre-irrigation efficiency, excessive deep percolation and on seepage losses.

## RECOMMENDED FORMAT FOR COMMENT LETTERS

Comment letters to the Regional Board on staff recommendations serve two purposes: 1) to point out areas of agreement with staff recommendations; and 2) to suggest revisions to staff recommendations. Clear statements of both areas of agreement and suggested revisions will assist the Regional Board and staff in understanding the recommendations of the commenter. The California Environmental Quality Act requires staff to respond to those comments submitted by the public which suggest revisions to staff recommendations, as long as those comments concern the environment. Staff will respond to all comments received by 17 April 1996 which suggest revisions to the Basin Plan Amendment. In order to aid staff in identifying suggested revisions and to respond to the specific concerns of the commenter, the following format for comment letters is suggested:

### Format for Comments Suggesting Revisions

The suggested format is to number the comment, state in one sentence the topic upon which the comment is directed, provide a supporting argument, and make a recommendation. Supporting arguments which include citations will assist staff in considering the comment. Below is an example.

The Environmental Action Team (EAT) recommends the following revision to staff recommendations:

#### *1. Proposed Xenon objective on Slug Slough*

Staff has recommended a 0.001 ng/L Xenon objective to protect resident guppies in Slug Slough. The U.S. EPA Xenon criteria for protection of guppies in fresh waters is currently 0.0001 ng/L - an order of magnitude lower than the staff recommendation. The U.S. EPA criteria is supported by several studies in peer reviewed journals (e.g. Smith and Jones; J. Env. Qual. (1994); Johnson; J. Env. Qual. (1995)). Staff arguments that the cost of analyzing for Xenon in water below 0.001 ng/L is prohibitive does not support the adoption of a water quality objective that is not protective of beneficial uses. More cost effective analytical procedures may be developed in response to the need for more intensive Xenon analysis. **EAT, therefore, strongly recommends the adoption of a 0.0001 ng/L Xenon objective to fully protect guppies in Slug Slough.**

### Format for Comments Supporting Staff Recommendations

If the commenter concurs with a staff recommendation, a statement to that effect will assist the Regional Board in determining what action, if any, to take on the staff recommendation. In general, no supporting discussion need be presented, unless the commenter feels that the staff recommendation could be further enhanced or clarified. Below is an example.

#### *2. Proposed Neon objective for Slug Slough*

**EAT strongly supports the adoption of the 0.05 pg/L Neon objective proposed by staff for Slug Slough.** In addition to arguments presented by staff, it should be pointed out that Harrison's recent work on goldfish (Harrison, et al, 1996) confirms the appropriateness of the proposed objective for the protection of fresh water aquatic life.



## **APPENDIX 40**



## Appendix 40 - Grassland Watershed Wetland Channels for Which Beneficial Uses Have Been Identified

### Southern Grassland Wetland Channels

	Starting Location	Ending Location
Agatha Canal North	Starts at the Agatha North/Geis split at NE1/4, SE1/4, SW1/4, Sec. 12, T11S, R11E	Discharges to the Santa Fe Canal at Mueller Weir at NW1/4, SW1/4, SW1/4, Sec. 21, T10S, R11E
Agatha Canal South	Division from Helm or Main Canal at NW1/4, SE1/4, NE1/4, Sec. 31 T11S, R12E	Terminates at the Agatha North/Geis split at NE1/4, SE1/4, SE1/4, Sec. 12, T11S, R11E
Almaden Ditch	Begins at the Agatha Canal at Mallard Rd at SE1/4, NE1/4, SE1/4, Sec. 12, T11S, R11E	Terminates at Mesquite Drain siphon at the SW1/4, SW1/4, SW1/4, Sec. 11, T11E, R11E
Almond Drive Ditch	Diversions from the Main Canal and Main Drain at the SW1/4, SW1/4, SW1/4, Sec. 6, T11S, R10E	Discharges to Reedley Ditch at SW1/4, SW1/4, SW1/4, Sec. 5, T11S, R10E
Ascot Ditch	Division from the Main Canal at the SE1/4, SW1/4, SW1/4, Sec. 7, T11S, R11E	Terminates at the SW1/4, SE1/4, SE1/4, Sec. 8, T11S, R11E
Britto Ditch	Division from Camp 13 at the NW1/4, SE1/4, NE1/4, Sec. 22, T11S, R11E	Terminates at the SW1/4, SE1/4, NE1/4, Sec. 10, T11S, R11E
Camp 13	Division of the Main Canal or Main Drain or Hamburg Drain at the SW1/4, SE1/4, SE1/4, Sec. 27, T11S, R11E,	Discharges to Mud Slough (south) at the SE1/4, NE1/4, NE1/4, Sec. 33, T10S, R11E
Charleston Drain	Freshwater diversions from the Outside Canal at the SW1/4, SW1/4, NE1/4, Sec. 32, T11S, R11E	Discharges to Upper Gadwall Ditch at the SW1/4, SW1/4, NW1/4, Sec. 6, T11S, R11E
Cocke Ditch	Division from the Arroyo Canal at the NE1/4, SW1/4, SW1/4, Sec. 21, T10S, R11E	Terminates at the NW1/4, SE1/4, SE1/4, Sec. 16, T10S, R11E
Colony Branch 2	Enters the Southern Grassland at the SW1/4, NW1/4, SW1/4, Sec. 8, T11S, R12E	Drains into Bennett Drain at the NE1/4, SE1/4, NE1/4, Sec. 7, T11S, R12E
Colony Branch 3/Bennett	Enters the Southern Grassland at the SE1/4, SW1/4, SW1/4, Sec. 5, T11S, R12E	Terminates at the Agatha Canal North at the SW1/4, SW1/4, SW1/4, Sec. 6 T11S, R12E
Cotton Drain	Enters the Grassland at the NW1/4, NE1/4, SE1/4, Sec. 32, T10S, R11E	Discharges to Mud Slough (s) at the SE1/4, SW1/4, SE1/4, Sec. 28, T10S, R11E

	Starting Location	Ending Location
Flyway Ditch	Diversion from Almond Dr. Ditch at SE1/4, SW1/4, SW1/4, Sec. 5, T11S, R11E	Discharges to Cotton Drain at the NW1/4, SE1/4, NE1/4, Sec. 32, T10S, R11E
Gables Ditch	Diversion of Main Canal at the NE1/4, NW1/4, NW1/4, Sec. 31, T11S, R12E	Terminates at the SW1/4, NW1/4, SW1/4, Sec. 18, T11S, R12E
Geis Ditch	Begins at the Agatha North/Geis split at the NE1/4, SE1/4, SE1/4, Sec. 12, T11S, R11E	Discharges to Camp 13 at NW1/4, NW1/4, SW1/4, Sec. 3, T11S, R11E
Helm Canal	Takeouts from the Main Canal at NE1/4, SE1/4, NE1/4, Sec. 31, T11S, R11E	Terminates at the Helm Canal extension at the SW1/4, SW1/4, NW1/4, Sec. 26, T11S, R11E
Line Ditch	Enters Grassland at the SW1/4, SE1/4, NE1/4, Sec. 5, T11S, R12E	Terminates at the NE1/4, NE1/4, NE1/4, Sec. 6, T11S, R12E
Lower Gadwall Canal	Continuation of the upper Gadwall, starts at the Almond Dr. intersection at the SE1/4, SE1/4, Sec. 5, T11S, R11E	Discharges to Mud Slough (south) at the NE1/4, NE1/4, NW1/4, Sec. 33, T10S, R11E
Meyers Ditch	Diversion from Helm Canal at SE1/4, SW1/4, SW1/4, Sec. 26, T11S, R11E	Terminates at the SE1/4, SW1/4, SW1/4, Sec. 23, T11S, R11E
Mud Slough (south)	Begins at the end of Camp 13 at the SE1/4, NE1/4, NE1/4, Sec. 33, T10S, R11E	Discharges to Salt Slough at the Los Banos WA at the NW1/4, NE1/4, SW1/4, Sec. 18, T9S, R10E
Pozo Drain	Enters the GWD at SW1/4, SW1/4, SW1/4, Sec. 8, T11S, R12E	Discharges to the Agatha Canal North at the NE1/4, SE1/4, NE1/4, Sec. 12, T11S, R12E
Reedley Ditch	Continuation of Almond Dr. Drain at the SW1/4, SW1/4, Sec. 4, T11S, R11E	Discharges to Camp 13 at the SE1/4, SE1/4, SE1/4, Sec. 4, T11S, R11E
Sun Pedro Canal	Diversion from the Arroyo Canal at the NW1/4, NE1/4, NW1/4, Sec. 26, T10S, R11E	Discharges to Boundary/ Devan Drain at the NE1/4, NE1/4, SE1/4, Sec. 31, T9S, R11E
SLCC Arroyo Canal	Enters the Southern Grassland at the NE1/4, SE1/4, NE1/4, Sec. 25, T10S, R11E	Discharges to the Santa Fe Canal at Mueller Weir at the NW1/4, SW1/4, SW1/4, Sec. 21, T10S, R11E
Sorsky Ditch	Diversion of Camp 13 and continuation of Sorsky Bypass at the NE1/4, NW1/4, NW1/4, Sec. 27, T11S, R11E	Discharges to Camp 13 at SW1/4, SW1/4, SW1/4, Sec. 3 T11S, R11E
Stillbow Ditch	Begins at Bennett Ditch at the SW1/4, SE1/4, SW1/4, Sec. 6, T11S, R12E	Discharges to the Agatha Canal North at the SW1/4, NW1/4, NW1/4, Sec. 36, T10S, R11E
240 Ditch	Diversion from Helm Canal at NE1/4, NW1/4, NW1/4, Sec. 36, T11S, R11E	Terminates at Sorsky Ditch at NE1/4, NW1/4, NE1/4, Sec. 23, T11S, R11E
Upper Gadwall Ditch	Diversion of Camp 13 at the NW1/4, SE1/4, SE1/4, Sec. 22, T11S, R11E	Terminates at Reedley Ditch at the NE1/4, NE1/4, NE1/4, Sec. 8, T11S, R11E

## Northern Grassland Wetland Channels

	Starting Location	Ending Location
Eagle Ditch	Diversion of the Santa Fe Canal at the NE 1/4, SE 1/4, NE 1/4, Sec. 30, T.8S, R.10E	Discharges to Mud Slough (north) at the SW 1/4, SE 1/4, NE 1/4, Sec. 7, T.8S, R.9E
Fremont Ditch	Diversion from San Luis Canal at the SE 1/4, SW 1/4, SW 1/4, Sec. 35, T.8S, R.10E	Discharges to Mud Slough (north) at the NW 1/4, NW 1/4, NE 1/4, NE 1/4, Sec. 20, T.8S, R.10
Garzas Creek	Enters Grassland Water District (GWD) at the intersection of Sections 22, 23, 26, 27 T.8S, R.9E	Discharges to Los Banos Creek NE 1/4, NE 1/4, NE 1/4, Sec. 26, T.8S, R.9E
Gun Club Road Ditch	Diversion of Los Banos Cr at the intersections of Sections 13, 14, 23, 24, T.8S, R.9E	Terminates at Eagle Ditch at the SW 1/4, SE 1/4, SE 1/4, Sec. 13, T.8S, R.9E
Kesterson Ditch	Diversion of the Santa Fe Canal at the SE 1/4, SE 1/4, SW 1/4, Sec. 32, T.8S, R.10E	Terminates at the NW 1/4, NW 1/4, SE 1/4, Sec. 34, T.8S, R.10E
Los Banos Creek	Begins service at CCID Main Canal at the SE 1/4, SW 1/4, SW 1/4, Sec. 9, T.10S., R.10E	Discharges to Mud Slough (north) at the NE 1/4, NW 1/4, SW 1/4, Sec. 26, T.7S, R.9E
Mosquito Ditch	Diversion from the San Luis Wasteway at the NE 1/4, NW 1/4, NW 1/4, 1/4, Sec. 19, T.9S, R.10E	Discharges to Los Banos Creek at NE 1/4, NE 1/4, SE 1/4, Sec. 6, T.9S, R.10E
Rubino Ditch	Diversion of the San Luis Spillway at the SW 1/4, SE 1/4, SW 1/4, Sec. 17, T.9S, R.10E	Terminates at the NW 1/4, SW 1/4, SW 1/4, Sec. 8, T.9S, R.10E
San Luis Canal	Starts at a diversion of the Main Canal at NE 1/4, NW 1/4, SW 1/4, Sec. 36, T.10S, R.10E	NE 1/4, NE 1/4, SW 1/4, Sec. 5, T.8S, R.10E
San Luis Spillway Ditch	Diversion of the San Luis Wasteway at the intersections of Sections 17, 18, 19, 20, T.9S, R.10E	Discharges to the Santa Fe Canal at SE 1/4, SE 1/4, SW 1/4, Sec. 16, T.9S, R.10E
San Luis Wasteway <sup>2</sup>		
Standard Ditch	Diversion from San Luis Canal at the NE 1/4, SE 1/4, NE 1/4, Sec. 25, T.9S, R.10E	Terminates at the NE 1/4, NE 1/4, SW 1/4, Sec. 15, T.9S, R.10E
Santa Fe Canal <sup>1</sup>	Extension of the Arroyo Canal at Mueller Weir at the NW 1/4, SW 1/4, SW 1/4, Sec. 21, T.10S, R.11E	Terminates at a tributary of Mud Slough (north) at the SW 1/4, SW 1/4, SE 1/4, Sec. 7, T.8S, R.10E
Santa Fe Canal Extension	Diversion of the Santa Fe Canal at the SW 1/4, Sec. 7, T.8S, R.10E	
Westside Ditch	Diversion of Garzas Cr at the intersection of Sections 22, 23, 26, 27, T.8S, R.9E	Discharges to Los Banos Creek at the SE 1/4, NW 1/4, NW 1/4, Sec. 11, T.8S, R.9E

<sup>1</sup> Begins as an extension of the Arroyo Canal. Receives only SLCC operational spill water at this point.

<sup>2</sup> Source is the Delta-Mendota Canal.